

**Abstract of the Disclosure**

Apparatus for deriving an analog signal from a pulse-width modulated signal, for use in a closed-loop control system such as a phase-locked loop, is arranged to provide non-linear conversion such that the ratio of the magnitude of the analog 5 output signal to the pulse width is greater for larger pulse widths than for smaller pulse widths. In the illustrated apparatus the output signal is derived by an integrator, gated by the pulse-width modulated signals, for integrating, during the duration of a pulse, a signal that increases with time. The increasing signal may be supplied by a positive feedback arrangement from the output of the integrator, or by a feed-forward 10 arrangement from the output of a further gated integrator arranged to integrate a constant signal.